Federal Democratic
Republic of Ethiopia

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ET ISO 12543-5 (2011) (English): Glass in building -- Laminated glass and laminated safety glass -- Part 5: Dimensions and edge finishing

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ETHIOPIAN STANDARD

ES ISO 12543-5:2012

First edition

Glass in building-laminatedglass and laminated safety glass-
Part 5:
Dimension and edge finishing

(Identical with ISO 12543-5:2011)

ICS: 81.040.20

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Foreword

This Ethiopian Standard has been prepared under the direction of the Technical Committee for Ceramic,terracotta building materials and glass(TC 37) and published by the Ethiopian Standards Agency(ESA).

The standard is identical with ISO 12543-5:2011 Glass in building — Laminated glass and laminated safety glass — Part 5: Dimensions and edge finishing published by International organization for standardization(ISO).

For the purpose of this Ethiopian Standard , the adopted text shall be modified as follows.

- The phrase “International Standard” shall be read as “Ethiopian Standard”; and
- A full stop (.) shall substitute comma (,) as decimal marker.

Glass in building — Laminated glass and laminated safety glass —

Part 5:
Dimensions and edge finishing

1 Scope

This part of ISO 12543 specifies dimensions, limit deviations and edge finishes of laminated glass and laminated safety glass for use in building.

This part of ISO 12543 is not applicable to panes having an area less than 0,05 m^2.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 12543-1, *Glass in building — Laminated glass and laminated safety glass — Part 1: Definitions and description of component parts*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12543-1 and the following apply.

3.1
displacement
d
misalignment at any one edge of the constituent glass panes or plastic glazing sheet material making up the laminated glass

See Figure 2.

4 Dimensions and limit deviations

4.1 Thickness

4.1.1 Nominal thickness

The nominal thickness of laminated glass shall be the sum of the nominal thicknesses of the constituent panes of glass, plastic glazing sheet material and the interlayers.

4.1.2 Limit deviation on thickness

4.1.2.1 Limit deviation on thickness of folio laminated products

The limit deviations on thickness of laminated glass shall not exceed the sum of the limit deviations of the constituent glass panes specified in the basic products standards; see ISO 12543-1:2011, Annex A.

NOTE 1 For the appropriate CEN standards, see ISO 12543-1:2011, Annex B.

If the total interlayer thickness is less than or equal to 2 mm, an additional limit deviation of ±0,1 mm applies. If the total interlayer thickness is greater than 2 mm, an additional limit deviation of ±0,2 mm shall apply.

The thickness limit deviation for plastic glazing sheet material shall be assumed to be the same as a float glass of the same nominal thickness.

NOTE 2 If the plastic glazing sheet material is covered by a standard, the actual limit deviations on thickness can be used.

EXAMPLE A laminated glass made from two sheets of float glass of 3 mm nominal thickness and a folio interlayer of 0,5 mm. The limit deviation of 3 mm float glass is given as ±0,2 mm and the limit deviation of the folio interlayer is ±0,1 mm. Therefore, the nominal thickness is 6,5 mm and the limit deviation is ±0,5 mm.

4.1.2.2 Limit deviations on thickness of cast-in-place products

The limit deviations on thickness of cast-in-place laminated glass shall not exceed the sum of the limit deviations of the constituent glass panes specified in the basic products standards and the limit deviations of the cast-in-place interlayers.

The thickness limit deviation for plastic glazing sheet material shall be assumed to be the same as a float glass of the same nominal thickness.

NOTE If the plastic glazing sheet material is covered by a standard, the actual limit deviations on thickness can be used.

The thickness limit deviations of cast-in-place interlayers shall be in accordance with Table 1.

Table 1 — Limit deviations on thickness of cast-in-place interlayers

Dimensions in millimetres

Interlayer thickness	Limit deviation
<1	±0,4
≥1 to <2	±0,5
≥2 to <3	±0,6
≥3	±0,7

EXAMPLE A laminated glass made from two sheets of float glass of 3 mm nominal thickness and a cast-in-place interlayer of 1,5 mm. The limit deviation of 3 mm float glass is given as ±0,2 mm and from Table 1 the interlayer tolerance is ±0,5 mm. Therefore, the nominal thickness is 7,5 mm and the limit deviation is ±0,9 mm.

4.1.2.3 Limit deviations on thickness of fire-resistant laminated glass

The limit deviations on thickness of fire-resistant laminated glass shall not exceed the sum of the limit deviations of the constituent glass panes specified in the basic products standards and the limit deviations of the fire-resistant interlayers.

The thickness limit deviation for plastic glazing sheet material shall be assumed to be the same as a float glass of the same nominal thickness.

NOTE If the plastic glazing sheet material is covered by a standard, the actual limit deviations on thickness can be used.

For the fire-resistant interlayers of fire-resistant laminated glass, the limit deviations shall be in accordance with Table 2.

Table 2 — Limit deviations on thickness of fire-resistant interlayer

Dimensions in millimetres

Interlayer thickness	Limit deviation
<1	±0,4
≥1 to <2	±0,5
≥2 to <5	±0,6
≥5	±1,0

4.1.2.4 Limit deviations on thickness of combinations

For laminated glass comprising different kinds of interlayers the limit deviation on thickness of the laminated glass shall be the sum of the allowed limit deviations of the constituent glass panes and the square root of the sum of the squares of the interlayer limit deviations, rounded to the nearest 0,1 mm.

EXAMPLE A laminated glass made from four sheets of float glass of nominal thickness 3 mm, a folio interlayer of 0,5 mm thickness and two fire-resistant interlayers of 1,5 mm thickness:

Nominal thickness: $4 \times 3\ \text{mm} + 0{,}5\ \text{mm} + 2 \times 1{,}5\ \text{mm} = 15{,}5\ \text{mm}$

Limit deviation: $4 \times (\pm 0{,}2\ \text{mm}) \pm \sqrt{0{,}1^2\text{mm} + 0{,}5^2\text{mm} + 0{,}5^2\text{mm}} = \pm 0{,}8\ \text{mm} \pm 0{,}714\ \text{mm} = \pm 1{,}5\ \text{mm}$

4.1.3 Measurement of thickness

The thickness of the pane shall be calculated as the mean of measurements taken at the centres of the four sides. The measurements shall be taken to an accuracy of 0,01 mm and the mean is then rounded to the nearest 0,1 mm.

The individual measurements, when rounded to the nearest 0,1 mm, shall also be within the limit deviations.

For laminated glass incorporating patterned glass, the measurement shall be made by means of an instrument of the plate gauge type with a diameter of 55 mm ± 5 mm.

4.2 Width, L, and length, H

4.2.1 General

When laminated glass sizes are quoted for rectangular panes, the first dimension shall be the width, L, and the second dimension the length, H, as shown in Figure 1.

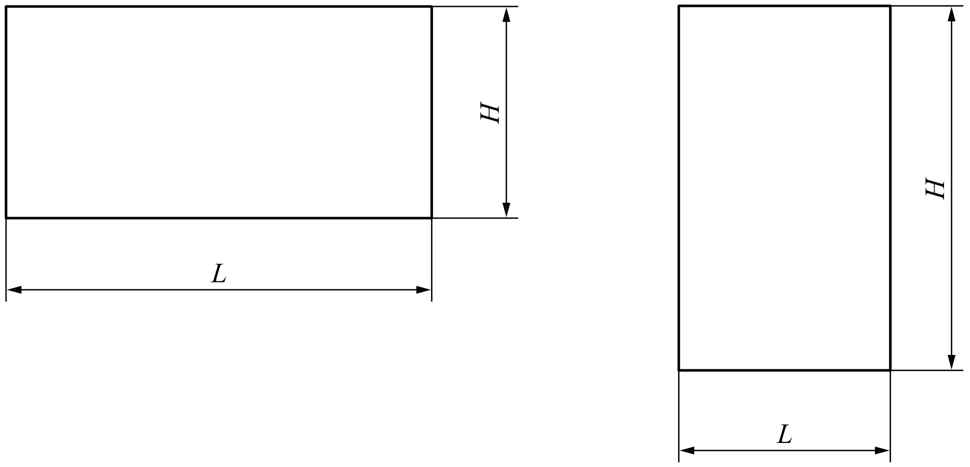

Figure 1 — Width and length relative to pane shape

The maximum width and length of laminated glass are dependent on the constituent glass and interlayers used in its composition and on the manufacturing plant of each individual manufacturer. Each manufacturer should indicate the maximum and minimum size they can produce.

Dimensions shall be given in millimetres. Each dimension shall be within the specified limit deviations.

4.2.2 Methods of measuring dimensions and squareness

The pane of glass shall not be larger than the nominal dimensions, given in accordance with 4.2.1, either increased by the upper limit deviation, t_1, or smaller than the nominal dimensions decreased by the lower limit deviation, t_2.

The squareness of rectangular glass panes is expressed by the difference between its diagonals.

The difference between the two diagonals shall not be larger than the limit deviation, v, as specified in Table 4.

4.2.3 Limit deviations on width, L, and length, H

Limit deviations on width, L, and length, H, are given in Table 3 for finished sizes and stock sizes. Any displacement shall be included in these limit deviations.

NOTE Displacement is covered in 4.2.4.

If one component of the laminated glass is a toughened or heat-strengthened glass an additional tolerance of ±3 mm shall be taken into account.

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Table 3 — Limit deviations, t_1 and t_2, on width, L, and length, H, for finished and stock sizes

Dimensions in millimetres

Nominal dimension L or H	Nominal thickness of laminated glass ≤8 mm	Nominal thickness of laminated glass >8 mm	
		Each glass pane <10 mm nominal thickness	At least one glass pane ≥10 mm nominal thickness
≤2 000	+3,0 −2,0	+3,5 −2,0	+5,0 −3,5
≤3 000	+4,5 −2,5	+5,0 −3,0	+6,0 −4,0
>3 000	+5,0 −3,0	+6,0 −4,0	+7,0 −5,0

The limit deviations given in Table 3 do not apply for fire-resistant laminated glass and fire-resistant laminated safety glass. In these cases, the manufacturer shall specify the limit deviations. The limit deviations, v, for the difference between diagonals are given in Table 4.

Table 4 — Limit deviations, v, on the difference between diagonals

Dimensions in millimetres

Nominal dimension L or H	Nominal thickness of laminated glass ≤8 mm	Nominal thickness of laminated glass >8 mm	
		Each glass pane <10 mm nominal thickness	At least one glass pane ≥10 mm nominal thickness
<2 000	6	7	9
<3 000	8	9	11
>3 000	10	11	13

4.2.4 Displacement

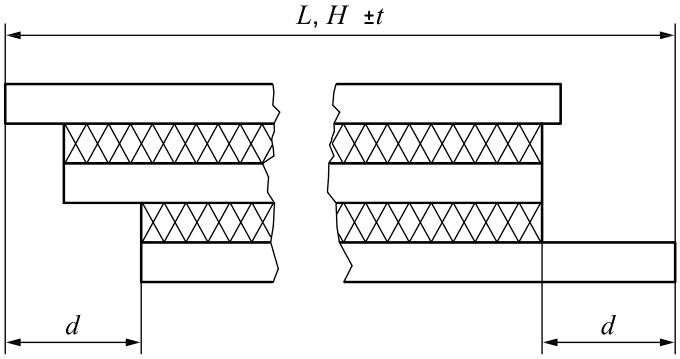

Figure 2 — Displacement

The maximum displacement, d, shall be as specified in Table 5. Width, L, and length, H, shall be considered separately.

Table 5 — Maximum displacement, d, for cut sizes and stock sizes

Dimensions in millimetres

Nominal dimension L or H	Maximum permissible displacement d
$L, H \leq$ 1 000	2,0
1 000 $< L, H \leq$ 2 000	3,0
2 000 $< L, H \leq$ 4 000	4,0
$L, H >$ 4 000	6,0

5 Edge finishes

5.1 General

Thermally treated glasses shall not be cut, sawn, drilled or edge worked after making into a laminate.

NOTE Thermally toughened safety glass, heat-soaked thermally toughened safety glass and heat-strengthened glass can be individually worked prior to thermal treatment in accordance with an applicable standard. The edges of fire-resistant laminated glass and fire-resistant laminated safety glass can be protected by an adhesive tape.

5.2 Cut edge

These are either originally cut edges of the constituent glass panes not subsequently worked (see Figure 3), or the edges of the laminated glass which have been cut and not subsequently worked (see Figure 4).

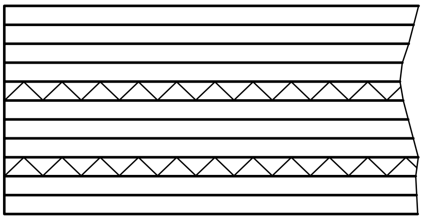

Figure 3 — Cut edge produced by the individual cut edges of the constituent glass panes which are not subsequently worked

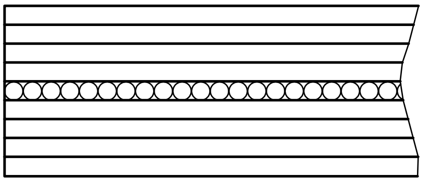

Figure 4 — Cut edge of cut laminated glass which is not subsequently worked

5.3 Worked edges

5.3.1 Arrissed edge

The originally cut edges of the outer glass panes of the laminated glass shall be ground off (see Figure 5).

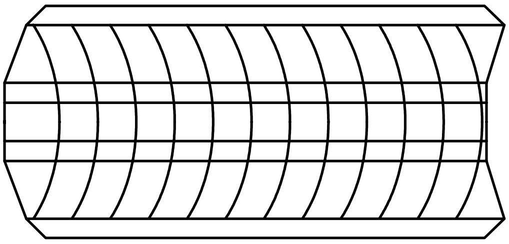

Figure 5 — Arrissed edge

5.3.2 Ground edge

The glass shall be arrissed and flat ground (see Figure 6).

NOTE Some bright areas can still exist on the edge face.

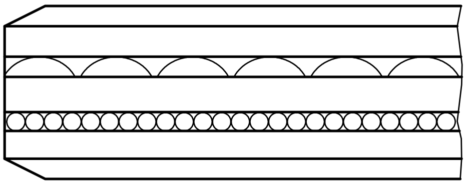

Figure 6 — Ground edge

5.3.3 Smooth ground edge

The edge face of the arrissed glass shall be ground and then smoothed with a finer grit than is used for ground edges and all bright areas shall be removed (see Figure 7).

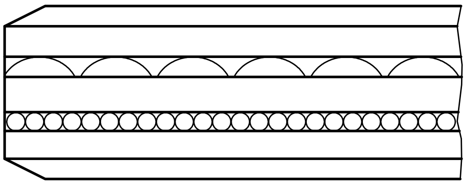

Figure 7 — Smooth ground edge

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5.3.4 Polished edge

The previously smooth ground edge shall be polished in order to obtain a high lustre on the arrissed and smoothed edges' surface (see Figure 8).

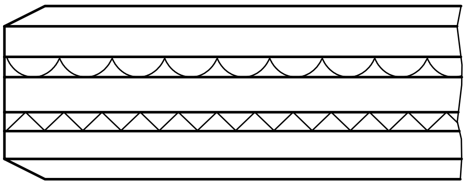

Figure 8 — Polished edge

5.3.5 Bevel edge

A bevel edge shall be a smooth ground or polished edge with an angle not exceeding 60°. The limit deviation on a bevel angle shall be ±3° (see Figure 9).

For greater angles and their limit deviations, the manufacturer should be contacted.

The nominal dimension, *L* or *H*, shall be reduced by 2 mm to 3 mm to cater for an arrissed edge.

Dimensions in millimetres

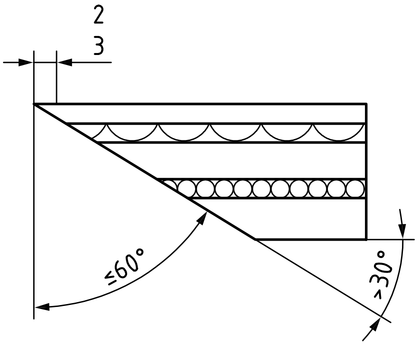

Figure 9 — Bevel edge

5.3.6 Sawn edge

A sawn edge shall be obtained by cutting with a saw.

NOTE The appearance is similar to ground edges, but without bright spots and arrissing.

5.3.7 Water jet cut edge

A water jet cut edge shall be obtained by cutting with a water jet.

NOTE The appearance is similar to ground edges, but without bright spots and arrissing.

6 Flatness

The flatness of laminated glass is dependent on the flatness of the constituent parts and can be influenced by the manufacturing conditions.

For the flatness of final cut sizes of folio laminated glass, ask the manufacturer.

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Ethiopian Standards Agency

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Organization and Objectives

The Ethiopian Standards Agency (ESA) is the national standards body of Ethiopia established in 2010 based on regulation No. 193/2010.ESA is established due to the restructuring of Quality and Standards Authority of Ethiopia (QSAE) which was established in 1970.

ESA's objectives are:-

- ❖ Develop Ethiopian standards and establish a system that enable to check weather goods and services are in compliance with the required standards,
- ❖ Facilitate the country's technology transfer through the use of standards,
- ❖ Develop national standards for local products and services so as to make them competitive in the international market.

Ethiopian Standards

The Ethiopian Standards are developed by national technical committees which are composed of different stakeholders consisting of educational Institutions, research institutes, government organizations, certification, inspection, and testing organizations, regulatory bodies, consumer association etc. The requirements and/ or recommendations contained in Ethiopian Standards are consensus based that reflects the interest of the TC representatives and also of comments received from the public and other sources. Ethiopian Standards are approved by the National Standardization Council and are kept under continuous review after publication and updated regularly to take account of latest scientific and technological changes.
Orders for all Ethiopian Standards, International Standard and ASTM standards, including electronic versions, should be addressed to the Documentation and Publication Team at the Head office and Branch (Liaisons) offices. A catalogue of Ethiopian Standards is also available freely and can be accessed in from our website.

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International Involvement
ESA, representing Ethiopia, is a member of the International Organization for Standardization (ISO), and Codex Alimentarius Commission (CODEX). It also maintains close working relations with the international Electro-technical Commission (IEC) and American Society for Testing and Materials (ASTM).It is a founding member of the African Regional Organization for standardization (ARSO).

More Information?
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